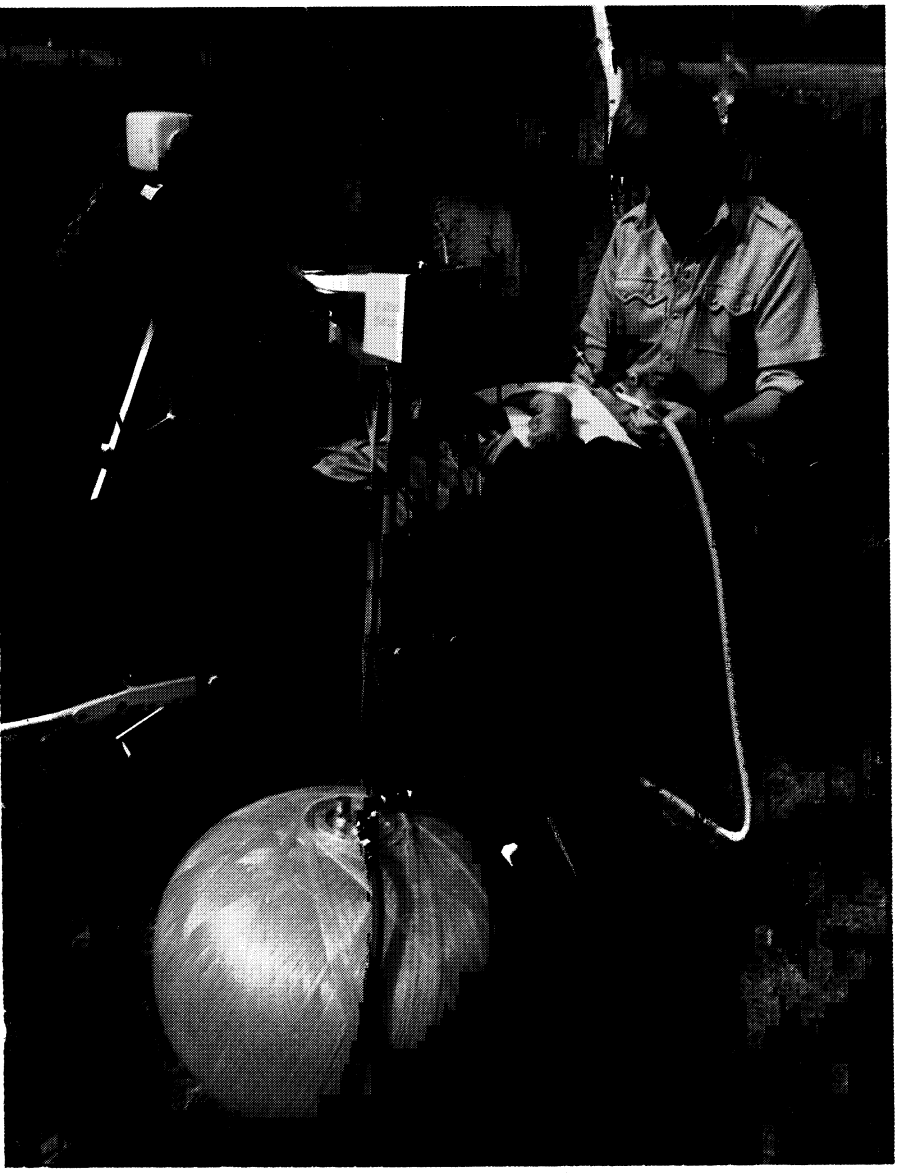

Portable Dental System

At left, Dr. Robert Mallien of Marquette Medical Dental Team, Inc., Milwaukee, Wisconsin demonstrates his portable system for providing dental care to isolated communities. The system includes a patient's chair and dentist's stool, an x-ray machine and a power unit, all of which fold into compact packages. The large yellow "pumpkin" in the foreground is a collapsible compressed air tank, developed by Dr. Mallien in association with D&H Composites, Inc., New Berlin, Wisconsin and NASA's Biomedical Application Team (BAT) at the University of Wisconsin. The portable system has been used successfully in South America, where Dr. Mallien visits out-of-the-way communities with his backpackable system, and in American nursing homes; it is being evaluated for field dentistry by U.S. armed forces.

Using specifications drawn by Dr. Mallien, the Wisconsin BAT sought to apply NASA composite materials technology to development of the compressed air container. The BAT put Dr. Mallien in touch with D&H Composites, which specializes in filament-walled composite materials. The collapsible tank that emerged from the cooperative effort holds up to 38 liters of air yet weighs less than five pounds. Below, Dr. Mallien shows how it can be collapsed like a deflated balloon for easy transportability.

The tank design employs principles originally developed under NASA contract to meet a need for collapsible stow-away spacecraft tanks. The outer skin is made of aramid fibers, once used by NASA as reinforcing materials in filament-wound pressure vessels, such as rocket propellant tanks. The fibers are woven in flexible resin and wound around an inflated bladder which serves as the inner tube. The toughness and abrasion resistance of the composite fibers protects against punctures and insures leak-free operation. The tank is now commercially available from D&H Composites.